REMARKS

Overview of the Office Action

Claims 1, 3-10, and 12-15 have been rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 7,010,305 ("Immonen") in view of U.S. Patent Pub. No. 2003/0009580 ("Chen").

Claims 6 and 16-17 have been rejected under 35 U.S.C. §103(a) as unpatentable over Immonen in view of Chen, and further in view of U.S. Patent No. 7,031,718 ("Jouppi").

Status of the claims

Claims 1, 3, 10, and 12 have been amended.

Claims 2 and 11 have previously been canceled.

Claims 1, 3-10, and 12-17 remain pending.

Interview Summary

Applicants' representative conducted a telephone interview on April 23, 2009. In the interview, the Examiner agreed that the present invention is distinguishable over the cited references (i.e., Immonen in view of Chen). However, the Examiner considers the currently pending claims 1 and 10 unclear and too broad.

More specifically, the Examiner stated that the limitation "determining an overall priority level (NPG) associated with the data stream" is unclear because the phrase "associating" an overall priority level with the data stream is unclear.

Further, the Examiner also considers the limitation "associating said overall priority level (NPG) with at least one quality of service process to be applied to the data stream, said quality of

service process differentiating access to network resources" to be unclear. The Examiner again considers the phrase "associating" the overall priority level with at least one quality of service process to be unclear.

The Examiner suggested using a word other than "associated" to describe both the connection between the overall priority level and the data stream, and the connection between the overall priority level and the quality of service process.

The Examiner further indicated that the difference between a "quality of service parameter" and a "quality of service process" is unclear. Thus, the Examiner suggested defining "quality of service parameter" and "quality of service process" in the claim itself.

The claims have been amended to address the Examiner's concerns as described in more detail below.

Rejections of claims 1, 3-10, and 12-15 under 35 U.S.C. §103(a)

The Office Action states that the combination of Immonen and Chen teaches all of Applicants' recited elements.

Before discussing the cited prior art and the Examiner's rejections of the claims in view of that art, a brief description of the subject matter described in the present application is deemed appropriate to facilitate understanding of the arguments for patentability. The description is not meant to argue unclaimed subject matter.

Applicants' invention is directed to a quality of service management method in a packet mode mobile communication network for a service to be executed by a subscriber in the network to which a data stream corresponds. Applicants' recited method includes determining a set of quality of service parameters that include at least one first quality of service parameter that

corresponds to a subscriber priority and at least one second quality of service parameter that is related to a type of service (see paragraph [0070] of Applicants' published specification).

Applicants' recited method further includes determining an overall priority level (NPG) for processing the data stream based on a value of the at least one first quality of service parameter and a value of the at least one second quality of service parameter (see paragraphs [0107]). The value of the overall priority level alone indicates a priority for accessing network resources to execute the service by the subscriber (see paragraph [0108]). Applicants' recited method still further includes determining at least one quality of service process to be applied to the data stream based on the overall priority level. The quality of service process differentiates access to network resources (see paragraphs [0072] and [0114]).

Thus, Applicants' recited method enables a mobile communications network operator to give priority in the processing of data streams based on an overall priority level that is based on both the service and the subscriber. The fact that this prioritization takes into account both the subscriber and the type of service enables the operator to give priority to certain subscriber categories with respect to other subscribers while offering services that have different requirements in terms of throughput and delay, and enables the operator to establish several priority levels for processing different data streams on the network in case of a network overload (see paragraphs [0101] and [0108] of Applicants' published specification).

Further, according to Applicants' recited invention, based on each of the configurable overall priority levels, at least one predefined QoS process to be applied to the data stream is determined. The at least one predefined QoS process that is used by each of the network nodes (BSS, SGSN, GGSN) to differentiate the access to resources in case of a network overload (see paragraph [0109] of Applicants' published specification). In other words, the network operator

is able to apply a different QoS process to a corresponding data stream for each user request according to its associated overall priority level to differentiate access to network resources amongst service subscribers.

Consequently, the overall priority level is used for enabling a fair distribution of available network resources among the various data streams, wherein each data stream corresponds to the execution of a service request. In that sense, each QoS process relates to differentiating access to network resources, and the overall priority level is used for distributing the available network resources among the various data streams based on the on-going user requests. Such predefined QoS processes include acceptance control, pre-emption, and differentiated resource allocation.

Acceptance control involves checking whether the resources are available for establishing the call at the node level of the network in question. Thus, in case of a network overload and depending on the overall priority level associated with the data flow that was determined by Applicants' recited invention, the acceptance control process determines whether the request should be accepted or not (see paragraph [0111] of Applicants' published specification).

Pre-emption involves the possibility of pre-empting the resources of another radio access support service (RAB). Thus, in case of an overload at a network node level, pre-emption is based on the overall priority level determined by the combination of QoS parameters according to Applicants' recited invention, in order to determine the subscribers with low priority level and force them to be removed from the network (see paragraph [0112] of Applicants' published specification).

Differentiated resource allocation involves, in case of a network overload during the channel establishment request, and for each node of the network in question, taking into account the overall priority level determined by the combination of QoS parameters according to

Applicants' recited invention in order to allocate a proportional throughput at the particular priority level (see paragraph [0113] of Applicants' published specification).

Independent claim 1 has been amended to recite a method that includes, inter alia, "determining an overall priority level (NPG) for processing the data stream based on a value of the at least one first quality of service parameter and a value of the at least one second quality of service parameter, the value of the overall priority level alone indicating a priority for accessing network resources to execute the service by the subscriber", and "determining at least one quality of service process to be applied to the data stream based on the overall priority level, said quality of service process differentiating access to network resources", which Immonen and Chen, whether taken alone or in combination fail to teach or suggest. Support for the claim amendments can be found in paragraphs [0072], [0108], and [0114] of Applicants' published specification.

Immonen discloses a method for assigning values of service attributes to transmissions, radio access networks, and network elements. According to Immonen, a Serving GPRS Support Node (SGSN) 12 stores default Quality of Service (QoS) profile 14 which includes a set of common values for some service attributes for all customers (see col. 8, lines 32-36 of Immonen). The values for the service attributes including the delivery order, the maximum Service Data Unit (SDU) size, the SDU error ratio, the residual Bit Error Rate (BER), the delivery of erroneous SDUs, and the allocation/retention priority (see col. 8, lines 36-40 of Immonen). A subscriber specific Max QoS is stored for each customer/subscriber (see col. 8, lines 47-51 of Immonen). A user equipment 11 may also transmit desired values of service attributes (see col. 8, lines 63-66 of Immonen). Accordingly, there are up to three sets of attributes that are stored in the SGSN 12 (see col. 9, lines 6-10 of Immonen).

The Examiner concedes that Immonen fails to teach or suggest Applicants' previously recited step of "associating said overall priority level (NPG) with at least one quality of service process to be applied to the data stream, said quality of service process differentiating access to network resources". Consequently, Immonen necessarily fails to teach or suggest Applicants' now recited step of "determining at least one quality of service process to be applied to the data stream based on the overall priority level, said quality of service process differentiating access to network resources", as recited in Applicants' amended claim 1.

The Examiner cites the col. 8, line 24 to col. 9, line 13 and the "parameter decision" shown in Fig. 1 of Immonen as teaching Applicants' step of "determining an overall priority level". Applicants disagree.

According to the cited passages of Immonen, the "parameter decision" refers to the operation of determining which QoS profile is to be used. As described above, a QoS profile according to Immonen is not an overall (global) priority level, as recited in Applicants' claim 1. The QoS profile of Immonen is a set of common values for service attributes (see col. 8, lines 35-36 of Immonen).

Once the particular QoS profile of Immonen is selected, the values for each of the service attributes in the particular QoS profile are used to determine the actual quality of service. Fig. 2 of Immonen discloses a flow chart, which indicates in detail how selection of the attributes is performed (i.e., how the "parameter decision" is made). The SGSN 12 selects the particular QoS profile, which includes the values of attributes to be used for a requested transmission (see col. 9, lines 11-13).

Immonen does not disclose that the service attribute values could be used together to determine a single specific attribute "alone indicating a priority for accessing network resources to execute the service by the subscriber", as expressly recited in Applicants' claim 1.

In other words, Immonen fails to disclose taking into account only one attribute (i.e., an overall priority level (NPG)), that is obtained from at least one first quality of service parameter corresponding to a subscriber priority level and at least one second quality of service parameter related to a type of service.

Further, Immonen provides no motivation for determining a single specific attribute, which defines a priority for accessing network resources.

Therefore, Immonen fails to teach or suggest the limitation "determining an overall priority level (NPG) for processing the data stream based on a value of the at least one first quality of service parameter and a value of the at least one second quality of service parameter, the value of the overall priority level alone indicating a priority for accessing network resources to execute the service by the subscriber", as now expressly recited in Applicants' amended claim 1.

Chen fails to teach or suggest what Immonen lacks. Chen discloses a telecommunications network that includes network resources that include at least one service domain, which has a user's terminal. There is a controller operative to control transmissions of a data stream from or to the user's terminal with a predetermined quality of service. The quality of service depends on the terms of a service level agreement between the user and the service domain, processed by the controller into a set of policies to be applied. The policies include dynamic selection and allocation of the network resources so as to transmit the data stream with the expected quality of service (see Abstract and paragraphs [0008] and [0041] of Chen).

The Examiner cites paragraphs [0028]-[0032], [0038]-[0040], and [0053]-[0068] of Chen as teaching Applicants' recited step of "determining an overall priority level". Applicants disagree.

As mentioned above, Chen discloses defining and applying policies to achieve a predetermined quality of service. The policies are derived from a Service Level Agreement (SLA) negotiated between a user and a network operator (see paragraphs [0008] and [0041] of Chen).

According to the cited passages of Chen, Service Level Agreements (SLAs) provide a set of specifications on various aspects of services including the QoS specifications that are agreed by two communication peers such as an end terminal with its network and between two networks. Service Level agreements can also be between a user and its service providers/network operators and between service providers/network operators. There are two categories of SLAs, which include an Intra-Domain SLA, which is the SLA between a user/network terminal equipment and its service provider/network operator/networks, and an Inter-Domain SLA, which is the SLA between two service providers/operators/networks. The service level agreements (SLAs) can define the minimum and maximum data rates which will be applied (throughput) and maximum call set-up time.

Chen further explains that the end-to-end service level agreement is the set of Intra-domain SLAs and Inter-Domain SLAs between two end user's terminal equipment. This SLA represents the agreed services and the associated qualities across all the networks/service domains between the two communication end points. In other words, end-to-end SLA is managed as the concatenation of Intra-domain SLAs and Inter-domain SLAs.

Chen teaches that the quality of service is specified in terms much more general than suitable for system configuration. For example, an application that demands transfer of an approximately known volume of data within a specified time justifies scheduling classes of traffic with appropriate capacity configurations along the path of the transfer. Such an application also requires (time of day) scheduling.

Chen further teaches that Policy and Services Policy management is often discussed in terms of the services that are supported by policy. There are different kinds and levels of information required when managing a networked environment. Service management is a relatively high level view of a system.

Chen also discloses that services are described in a manner that is higher-level than policy itself. In other words, services are described in a form that describes characteristics from which policy information is then derived. Such a higher level representation may be required to perform some functions in a managed telecommunications environment. For example, different policies that describe different behaviors may be deployed to two network entities through which a customer's traffic passes. In such an environment, it may be impossible to tell if a conflict exists simply by looking at the policies themselves, but it may be possible to determine if a conflict exists with the service(s) to which the customer has subscribed.

Chen also states that the QoS Service Classes are usually device independent. They represent the expected attributes to be exhibited by traffic delivery behavior across the same network domain. Therefore, they can be domain dependent. For example, UMTS QoS Service Classes may expect different traffic handling behavior from the DiffServ QoS Service Classes. It has a set of subclasses that define device-independent QoS control primitives. In the UMTS Service Domain, the QoS Service Classes include: Conversational Bearer Service; Streaming

Bearer Service; Interactive Bearer Service; and Background Bearer Service. In the DiffServ Service Domain, the QoS Service Classes included: AF (Assured Forwarding) Bearer Service: EF Bearer Service; and BE (Best-Effort) Bearer Service. In the IntServ Service Domain, the QoS Classes include: G (Guaranteed) Bearer Service; and CL (Controlled Load) Bearer Service. In the GPRS, the QoS classes include: Throughput Bearer, and Delay Bearer.

In other words, Chen specifies that the policy decisions are enforced during the QoS management including resource access control and traffic handling and conditioning (see paragraph [0041] of Chen). Further, these policy decisions are applied so as to enable flexible and dynamic selection and configuration of resources (see paragraph [0011] of Chen). It is the contents of the entire SLA of Chen (which includes many applied parameters) that determines the QoS for the network resources, which is then dynamically altered based on the policies implemented (which also includes many parameters), which resolve network conflicts.

There is nothing in the cited passages of Chen teaches or suggests a step of "determining an overall priority level (NPG) for processing the data stream based on a value of the at least one first quality of service parameter and a value of the at least one second quality of service parameter, the value of the overall priority level alone indicating a priority for accessing network resources to execute the service by the subscriber", as recited in Applicants' amended claim 1.

The Examiner also cites paragraphs [0008], [0013], and [0019] of Chen as teaching Applicants' recited step of "associating said overall priority level (NPG) with determining at least one quality of service process to be applied to the data stream, said quality of service process differentiating access to network resources". Applicants disagree.

Nevertheless, as discussed above, independent claim 1 has been amended to now recite "determining at least one quality of service process to be applied to the data stream based on the

overall priority level, said quality of service process differentiating access to network resources", which Chen fails to teach or suggest.

The cited passages of Chen state that the telecommunications network includes network resources that include at least one service domain which comprises a users terminal and a controller operative to control transmission of a data stream from the user's terminal to another network node and/or to the user's terminal from another network node with a predetermined quality of service, where the quality of service is dependent upon the terms of a service level agreement (SLA) between the user and the service domain, processed by the controller into a set of policies to be applied, the policies including selection and allocation of the network resources so as to transmit the data stream with the selected quality of service.

As stated above, it is the contents of the entire SLA of Chen (which includes many applied parameters) that determines the QoS for the network resources, which is then dynamically altered based on the policies implemented (which also includes many parameters), which resolve network conflicts. There is nothing in, or about, the policies of Chen that involve determining at least one quality of service process to be applied to the data stream based on an overall priority level, as recited in Applicants' claim 1.

The cited passages of Chen also state the system incorporates SLAs into the QoS resource management in 3G networks such as UMTS and future networks infrastructures and is directed at providing QoS with efficient use of resources thereby enabling the operators and service providers to differentiate their services by emphasizing their service eccentric QoS requirements. QoS Policies are identified to be the link between the SLA-based service level QoS policy management and the policy-based QoS provisioning and resource management at the transport bearers level. This again simply teaches that the policies resolve conflicts in resource

management. The cited passages teach or suggest nothing regarding determining at least one quality of service process to be applied to the data stream based on the overall priority level, as recited in Applicants' claim 1.

The cited passages of Chen also further state that the data stream is transmitted so as to provide the user with a predetermined quality of service, said quality of service being dependent upon the terms of a service level agreement (SLA) between the user and the service domain in which the user's terminal resides, the terms of the service level agreement being processed into a set of policies to be applied, the policies including selection and allocation of resources so as to provide the selected quality of service. These cited passages unambiguously teach that the QoS is dependent upon the SLA, which includes several applied parameters, and that various policies are applied to determine the selection and allocation of network resources.

In other words, as discussed in detail above, the SLA cannot in any way be construed to be an overall priority level for processing the data stream. Further, the application of Chen's policies has nothing to do with determining at least one quality of service process to be applied to the data stream based on the overall priority level, where the quality of service process differentiates access to network resources.

Although the policies of Chen depend on both an indication of a subscriber priority and an indication related to a type of service, Chen teaches that those policies are used to adapt the QoS processes usually applied to a data stream. However, Chen clearly fails to teach or suggest determining at least one quality of service process to be applied to the data stream based on the overall priority level, said quality of service process differentiating access to network resources.

In contrast to Chen, Applicants' recited invention involves determining which particular QoS process should be applied to the data stream as a function of the overall priority level (see

paragraphs [0109]-[0114] of Applicants' specification).

Thus, Chen also fails to teach or suggest "determining an overall priority level (NPG) for processing the data stream based on a value of the at least one first quality of service parameter and a value of the at least one second quality of service parameter, the value of the overall priority level alone indicating a priority for accessing network resources to execute the service by the subscriber", and "determining at least one quality of service process to be applied to the data stream based on the overall priority level, said quality of service process differentiating access to network resources", as now expressly recited in Applicants' independent claim 1.

In view of the foregoing, Applicants submit that Immonen and Chen, whether taken alone or in combination, fail to teach or suggest the subject matter recited in amended independent claim 1. Accordingly, claim 1 is patentable over Immonen and Chen under 35 U.S.C. §103(a).

Claims 10 and 15 recite or have been amended to recite limitations similar to claim 1 and are, therefore, deemed to be patentably distinct over Immonen and Chen for at least those reasons discussed above with respect to independent claim 1.

Claims 3-9 and 12-14, which depend from independent claims 1 and 10 incorporate all of the limitations of the respective independent claim and are, therefore, deemed to be patentably distinct over Immonen and Chen for at least those reasons discussed above with respect to independent claims 1 and 10.

With respect to claim 3, neither Immonen nor Chen discloses Applicants' recited features. According to the Examiner, the claim subject matter of claim 3 is disclosed on col. 8 line 24 - col. 9 line 13 of Immonen, through the ARP parameter. However, the ARP parameter of Immonen is not an overall priority level, as recited in Applicants' claims.

Rejection of claims 6 and 16-17 under 35 U.S.C. §103(a)

The Office Action states that the combination of Immonen, Chen, and Jouppi teaches all of the elements recited in Applicants' claims.

Immonen and Chen have been previously discussed and does not teach or suggest the invention recited in Applicants' independent claim 1.

Because Immonen and Chen fail to teach or suggest the subject matter recited in Applicants' independent claim 1, and because Jouppi fails to teach or suggest any elements of the independent claims that Immonen and Chen are missing, the addition of Jouppi to the reference combination fails to remedy the above-described deficiencies of Immonen and Chen.

Claims 16 and 17 recite limitations similar to claim 1 and are, therefore, deemed to be patentably distinct over Immonen, Chen, and Jouppi for at least those reasons discussed above with respect to independent claim 1.

Claim 6, which depends from independent claim 1, incorporates all of the limitations of claim 1 and is, therefore, deemed to be patentably distinct over Immonen, Chen, and Jouppi for at least those reasons discussed above with respect to independent claim 1.

Conclusion

In view of the foregoing, Applicants respectfully request reconsideration, withdrawal of all rejections, and allowance of all pending claims in due course.

Should the Examiner have any comments, questions, suggestions, or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

It is believed that no fees or charges are required at this time in connection with the present application. However, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,
COHEN PONTANI LIEBERMAN & PAVANE LLP

By _____

Alfred W. Froebrich
Reg. No. 38,887
551 Fifth Avenue, Suite 1210
New York, New York 10176
(212) 687-2770

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